

SUPPLEMENTAL SITE CHARACTERIZATION

Federal Center South
4735 East Marginal Way South
Seattle, Washington

Prepared for

U.S. General Services Administration
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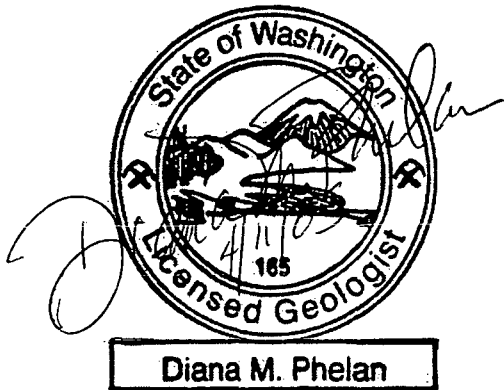
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Work for this supplemental site investigation was performed in accordance with generally accepted professional standards and practices for the type of work performed. While information regarding subsurface conditions, including soil and ground water quality, is believed to be generally representative of conditions at the site, conditions may change within short distances. Additional subsurface materials and contaminants may be present at locations not investigated during this study.



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Introduction

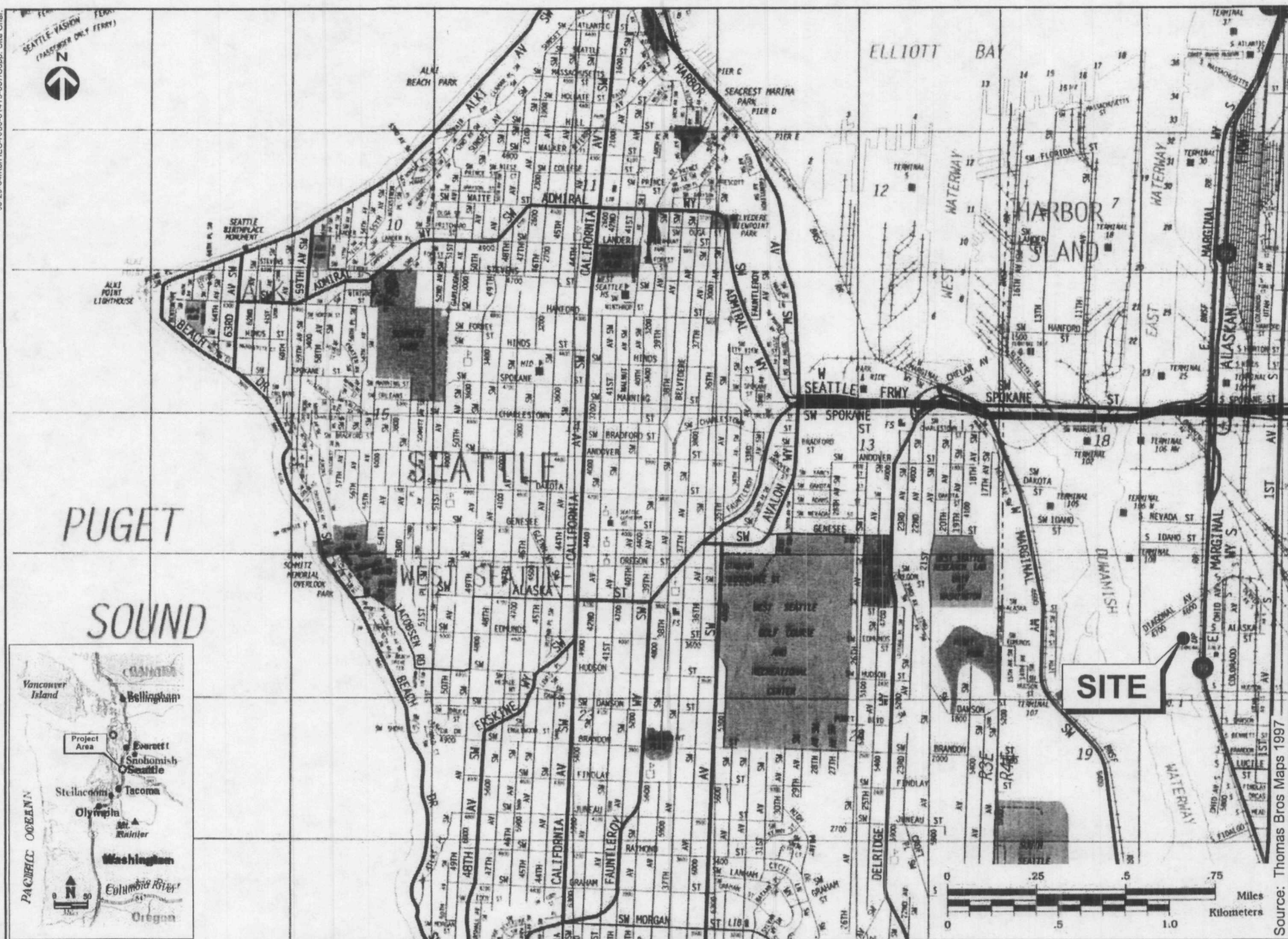
This supplemental site characterization report presents the results of field activities conducted on behalf of U.S. General Services Administration (GSA) at the former motor pool facility in Seattle, Washington. GSA owns and manages the Federal Center South facility including the former motor pool. The facility is located at 4735 East Marginal Way South along the eastern riverbank of the Duwamish Waterway within the industrial portion of South Seattle (Figure 1).

GSA has entered into the Voluntary Cleanup Program (VCP) with the Washington Department of Ecology (Ecology). Based on Ecology's review of the Herrera report titled *Independent Remedial Action Report—Federal Center South* (Herrera 2003), Ecology recommended further site assessment and possibly additional site cleanup be conducted prior to issuing a No Further Action designation for the site. Soil sampling was recommended to evaluate residual contamination surrounding a former gasoline tank excavation located adjacent (west) of Building 12.03 (Figure 2). An additional ground water sample was recommended to be collected from monitoring well FC3, to demonstrate the continued downward trend of benzene concentrations in that well. The previous three quarterly sampling events from that well indicated benzene concentrations less than the Model Toxics Control Act method A cleanup criterion of 5 micrograms per liter ($\mu\text{g/L}$).

Based on push-probe sampling performed in September 2002, the presence of heavy oil-range hydrocarbons detected in ground water in well FC9 does not appear to be the result of the two former underground storage tanks associated with Building 12.03. Two likely sources of sporadic heavy oil contamination are from imported fill and/or historic site operations. According to discussions with Ecology, continued monitoring or contaminated soil excavation followed by continued monitoring of well FC9 would be required until analytical results of heavy oil-range hydrocarbons decrease below cleanup criteria for four quarters. Additional monitoring or soil excavation in the vicinity of well FC9 was not part of this supplemental site characterization and will be considered at a later date.

Objective and Scope

The objectives of this site investigation focused on characterizing soil adjacent to and downgradient of the former tank excavation for potential presence and extent of gasoline-contaminated soil and to provide further analysis of ground water at well FC3. Site characterization included collection of soil samples at the water table for chemical analysis at 14 probe boring locations positioned at intervals of 10 to 15 feet immediately adjacent and downgradient of the tank excavation. Analytical results of one ground water sample collected from monitoring well FC3 were generated to characterize ground water quality downgradient of the gasoline source area.



Source: Thomas Bros Maps 1997

Figure 1. Vicinity map, Federal Center South, Seattle, Washington.

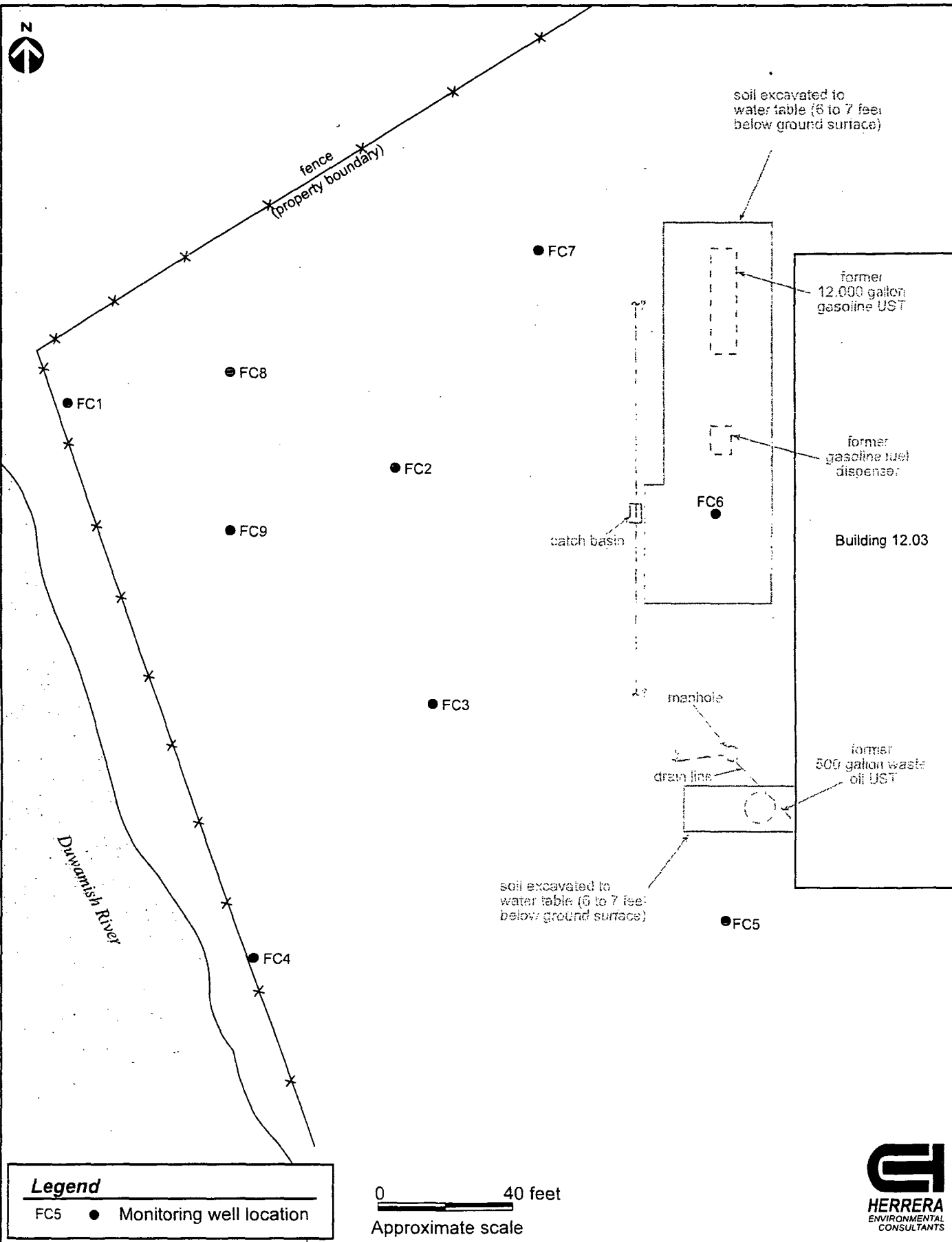


Figure 2. Ground water monitoring wells and former tank excavations west of building 12.03 at Federal Center South, Seattle, Washington.

Site Background

The site ranges 5 to 10 feet above mean sea level, consisting of a relatively level concrete/asphalt parking lot and several multi-story office and warehouse buildings. The former GSA motor pool occupied Building 12.03, which is currently leased by the U.S. Federal Bureau of Investigation for servicing vehicles. No soil is exposed to the surface at any place onsite, with the exception of a small area at the northwest corner of the property. The locations of historic underground storage tanks and existing monitoring wells are provided in Figure 2.

The following site characterization and cleanup activities have been conducted at the Federal Center South site west of Building 12.03 since underground storage tanks were removed in May 1998:

| Date | Deliverables | Field Investigation Conducted (Date) |
|------------------------------|--|--|
| May 1998 | Underground Storage Tank Site Assessment (dated May 3, 1999) | <ul style="list-style-type: none"> Underground storage tank decommissioning and closure activities, including excavation and removal of one 12,000-gallon gasoline tank, one 1,000-gallon waste oil tank, and approximately 170 cubic yards of contaminated soil (May 1998) |
| August 1998 to July 1999 | Environmental Site Assessment and Ground Water Monitoring (dated January 7, 2000) | <ul style="list-style-type: none"> Site investigation including soil and ground water sampling from 15 push probe locations (August 1998) Additional soil excavation (approximately 350 cubic yards) from the gasoline dispenser area and around the waste oil tank (April 1999) Installation of 7 monitoring wells (FC1 through FC7) and first quarter sampling event (June and July 1999) |
| October 1999 to April 2001 | Baseline Ground Water Monitoring (dated December 11, 2001) | <ul style="list-style-type: none"> Collection of ground water samples from wells FC1 through FC7 during eight sampling events (October 1999 through April 2001) Installation of monitoring wells FC8 and FC9 (installed in October 2000) and collection of ground water samples from three sampling events (October 2000 through April 2001) |
| July 2001 through April 2003 | Independent Remedial Action (dated July 17, 2003) | <ul style="list-style-type: none"> Collection of ground water samples from wells FC1 through FC9 during four sampling events (July 2001 through April 2002) Collection of soil and ground water at six push probe locations near FC9 (September 2002) Collection of ground water samples from well FC9 during four sampling events (April 2002 through April 2003) |

In May 1998, tanks removed west of Building 12.03 included a 12,000-gallon gasoline tank used to provide fuel for motor pool vehicles and a 1,000-gallon waste oil used for storage of fluids resulting from motor pool vehicle maintenance. Limited exploration during the tank removal process indicated a gasoline release beneath a former fuel dispenser unit, extending approximately 30 feet to the south and west. Approximately 100 feet south of the gasoline tank,

a waste oil tank also was found to have released diesel and heavy oil to soil immediately surrounding the tank. Initial contaminant characterization indicated that polychlorinated biphenyls (PCBs), halogenated volatile organics, polycyclic aromatic hydrocarbons (PAHs), and metals were not of concern and have not been further analyzed (Herrera 1999, 2000, 2001).

Results of ground water monitoring during 12 sampling events following tank removal and cleanup activities between July 1999 and April 2002 indicated the following site conditions (Herrera 2003):

- No benzene contamination was detected in samples collected from downgradient wells FC1, FC4, and FC9, indicating that contaminants had not migrated offsite.
- No benzene contamination was detected above the practical quantitation limit (1 µg/L) in samples collected in crossgradient wells FC5 and FC7, indicating that the contaminant plume had not expanded laterally
- Soil removal and natural attenuation have resulted in improved ground water quality downgradient of the former gasoline and diesel fuel underground storage tanks
- Benzene concentrations were below the MTCA method A cleanup criterion for four sampling events in monitoring well FC2 and three sampling events in FC3, both wells positioned downgradient of the original source area with respect to inferred ground water flow direction (west and southwest)
- Statistical analysis (Mann-Kendall) indicated a decreasing trend in benzene concentrations in well FC2 and a stable level in FC3.

Supplemental Site Investigation Summary

In February 2004, a followup site investigation was conducted to address Ecology concerns for the potential presence of residual gasoline contamination in soil downgradient of the former gasoline tank excavation. The site investigation consisted of drilling and collecting soil samples for chemical analysis at selected locations immediately adjacent to and downgradient of the former tank excavation using the push probe drilling method. A ground water sample also was collected and analyzed from well FC-3, approximately 60 feet downgradient of the former tank excavation.

A detailed description of field procedures, including drilling, sample collection, handling, and decontamination, is presented in Appendix A of this report. Geologic logs for 14 push-probe borings completed as part of this investigation are provided in Appendix B. Laboratory analytical reports for samples collected during the site investigation and a data quality assurance review for all analytical results are provided in Appendix C. Waste disposal documentation is provided in Appendix D.

Drilling and sampling activities were conducted on February 18, 2004. Herrera Environmental Consultants, Inc. collected soil and ground water samples for chemical analysis; Cascade Drilling, Inc. of Woodinville, Washington provided push-probe drilling services; and OnSite Environmental Inc. of Redmond, Washington analyzed soil and ground water samples for gasoline constituents. Results of this investigation are described in the following sections.

Drilling and Sampling Procedures

The field investigation conducted at the Federal Center South facility consisted of drilling and sampling soil from the vadose zone immediately above the water table at 14 push-probe boring locations (GP1 through GP14; see Figure 3). Probe boring locations GP1 through GP5 were located immediately adjacent to the former gasoline tank excavation. Probe boring locations GP6 through GP14 were selected downgradient based on 10-foot spacings dependent on field screening results from initial probe borings adjacent to the old excavation.

Soil Sample Collection from Push Probe Borings

Each probe boring was driven to a maximum depth of 8 feet below ground surface (bgs). Soil samples were collected continuously at 4-foot depth intervals until ground water was encountered at depths ranging from 4 to 5.5 feet bgs. Soil samples were retrieved using a decontaminated push drive soil-sampling probe, lined with a clear Lexan[®] liner. Soil samples were visually classified for lithology, field screened for the presence of volatile organic compounds using a photoionization detector (PID), and observed for moisture content indicating the presence of ground water.

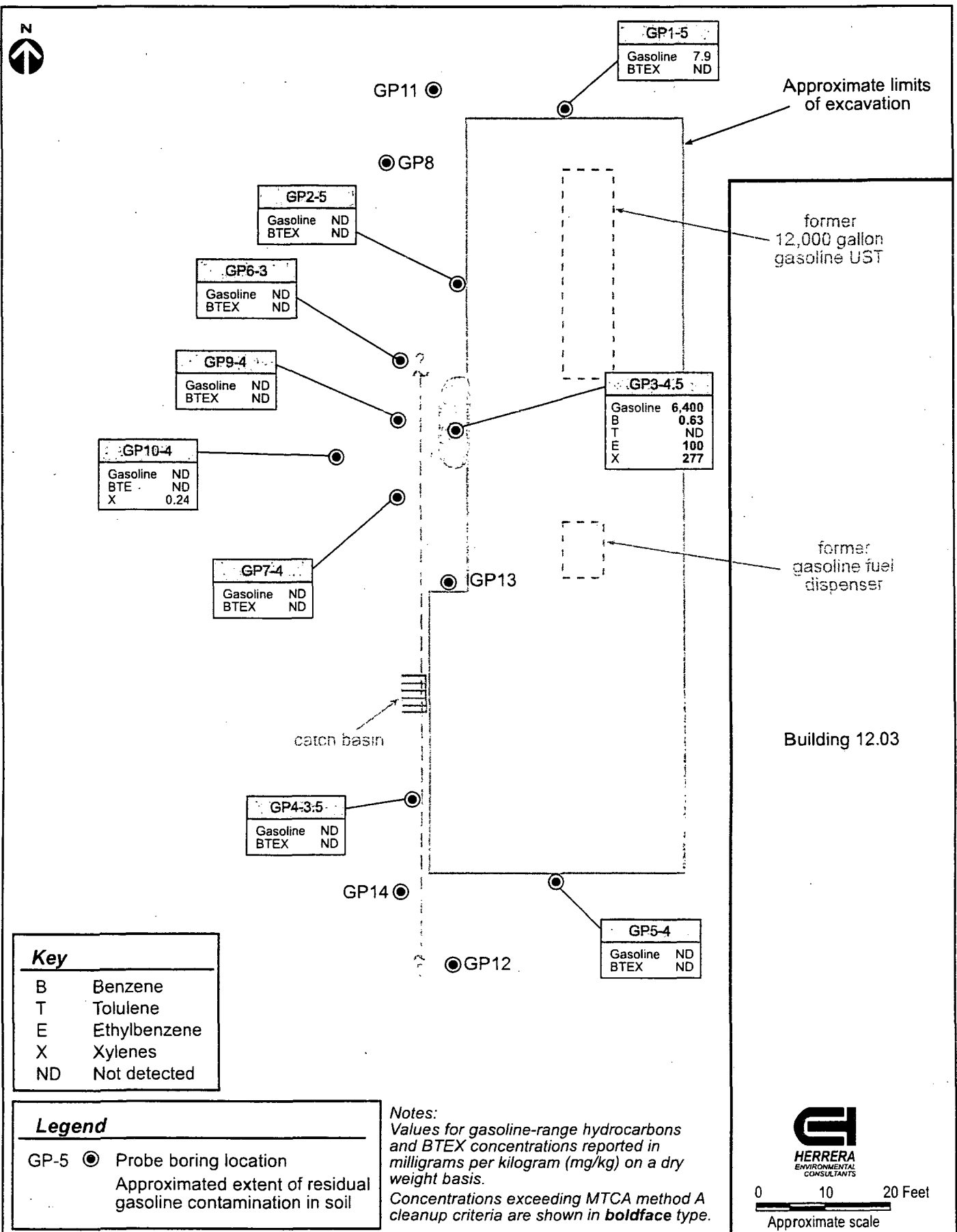


Figure 3. Gasoline and BTEX results in soil samples collected from borings drilled adjacent to the former gasoline tank excavation, Federal Center South.

Soil samples collected from borings GP1 through GP7, GP9, and GP10 were selected for chemical analysis based on field screening results and field observations. Samples were generally collected within the assumed water table zone of fluctuation, between 3 and 5 feet bgs. Soil was retrieved from the liner and placed directly into sample containers provided by the analytical laboratory. All sample containers were labeled and then stored in chilled coolers prior to being hand-delivered to the laboratory.

After soil samples were collected, the probe boreholes were backfilled with bentonite chips, then sealed at the surface with asphalt patch.

Ground Water Sample Collection from Monitoring Well FC3

A ground water sample was collected for chemical analysis from monitoring well FC3 on February 18, 2004 using a dedicated disposable high-density polyethylene bailer attached with clean nylon twine. The well was purged a minimum of three well casing volumes prior to sample collection; water parameters, including temperature, pH, and specific conductivity were measured and recorded during purging. The well was purged until water parameters had stabilized, then the sample was collected using the same disposable bailer used for purging, pouring the contents of the bailer into sample containers provided by the analytical laboratory. Immediately upon filling, each container was securely capped, labeled, and placed into a chilled cooler for storage prior to and during delivery to the analytical laboratory.

Sample Analysis

Soil samples collected and submitted under chain-of-custody protocol to the laboratory for chemical analysis included a depth of 5 feet bgs in probe borings GP1 and GP2; 4.5 feet bgs in boring GP3; 3.5 feet bgs in boring GP4; and 4 feet bgs in boring GP5. The soil samples mentioned above and the ground water sample collected from well FC3 were analyzed for the presence of gasoline-range hydrocarbons using the northwest total petroleum hydrocarbon test method (NWTPH-Gx) and for benzene, toluene, ethylbenzene, and xylenes (BTEX) using the U.S. Environmental Protection Agency (EPA) 8021B test method.

Based on gasoline and BTEX detections from soil collected at 4.5 feet bgs in boring GP3, four additional probes GP6, GP7, GP9, and GP10 were drilled close to GP3. Soil samples collected at 3 feet bgs in GP6 and 4 feet bgs in borings GP7, GP9, and GP10 were analyzed for gasoline constituents using the NWTPH-Gx and U.S. EPA 8021B test methods.

The complete laboratory analytical report and a data quality assurance review of all analytical data on soil and ground water samples collected during the supplemental site characterization are included in Appendix C.

Results

Subsurface Conditions

Soils encountered in borings drilled during previous investigations and this field investigation conducted at the Federal Center South facility generally consisted of olive brown sand overlying a very dark gray to black fine-grained sand. The olive brown sand layer was encountered in all 14 borings, extending from beneath the asphalt pavement to depths ranging from 1 to 4 feet bgs. The base of the dark gray/black sand unit was not reached in any of the borings, all drilled to a maximum depth of 8 feet bgs.

An iridescent sheen and hydrocarbon-like odors were noted in the soil sample retrieved from 4.5 feet bgs in boring GP3. A slight hydrocarbon-like odor was noted in the soil sample retrieved from 5 feet bgs in boring GP1 and 2 feet bgs in GP5. No soil staining or hydrocarbon-like odors were noted in any of the soil samples retrieved from the eleven remaining borings. PID readings above background levels were detected in samples from borings GP1 through GP6 and GP9, ranging from 77.2 to greater than 2,000 parts per million (ppm). No PID readings were detected in samples collected from borings GP7, GP8, and GP10 through GP14.

Ground water was encountered in each of the 14 probe borings at depths ranging from 4 to 5.5 feet bgs. Based on these measurements and on results of previous investigations, ground water flow direction is to the west-southwest.

Data Quality Assurance Review

The soil samples collected from borings GP1 through GP7, GP9, and GP10 and the ground water sample collected from monitoring well FC3 were analyzed for gasoline constituents. All analytical results were determined to be acceptable for use based on the data quality assurance review presented in Appendix C.

Soil Analytical Results

Analytical results of soil samples collected during the field investigation are summarized in Table 1 and illustrated in Figure 3. Gasoline-range hydrocarbons, benzene, ethylbenzene, and xylenes were detected at concentrations above MTCA method A cleanup levels in soil collected at 4.5 feet bgs from boring GP3. Gasoline also was detected in soil at 5 feet bgs in boring GP1 (7.9 milligrams per kilogram [mg/kg]), at a concentration below the MTCA method A cleanup level of 30 mg/kg. Xylenes were detected in soil at 4 feet bgs in boring GP5 (0.24 mg/kg), which is below the method A cleanup level of 9 mg/kg. No gasoline constituents were detected above practical quantitation limits from soil collected at the six remaining borings.

Table 1. Gasoline and BTEX results of soil samples (mg/kg) collected from probe borings drilled at Federal Center South, Seattle, Washington.

| Sample Identification | Sample Depth Interval (feet) | Gasoline-range hydrocarbons ^b | Benzene ^c | Toluene ^c | Ethylbenzene ^c | Xylenes ^c |
|---|------------------------------|--|----------------------|----------------------|---------------------------|----------------------|
| <i>MTCA method A cleanup level ^a</i> | | <i>30 ^d</i> | <i>0.03</i> | <i>7</i> | <i>6</i> | <i>9</i> |
| GP1-5 | 5.0 | 7.9 | ND (0.012) | ND (0.06) | ND (0.06) | ND (0.06) |
| GP2-5 | 5.0 | ND (6.0) | ND (0.012) | ND (0.06) | ND (0.06) | ND (0.06) |
| GP3-4.5 | 4.5 | 6,400 | 0.63 | ND (1.2) | 100 | 276.7 |
| GP4-3.5 | 3.5 | ND (5.7) | ND (0.011) | ND (0.057) | ND (0.057) | ND (0.057) |
| GP5-4 | 4.0 | ND (6.0) | ND (0.012) | ND (0.06) | ND (0.06) | ND (0.06) |
| GP6-3 | 3.0 | ND (5.5) | ND (0.011) | ND (0.055) | ND (0.055) | ND (0.055) |
| GP7-4 | 4.0 | ND (5.5) | ND (0.011) | ND (0.055) | ND (0.055) | ND (0.055) |
| GP9-4 | 4.0 | ND (5.3) | ND (0.011) | ND (0.053) | ND (0.053) | ND (0.055) |
| GP10-4 | 4.0 | ND (5.7) | ND (0.011) | ND (0.057) | ND (0.057) | 0.24 |

Values reported on a dry weight basis.

Values in **boldface** type exceed MTCA method A soil cleanup levels.

ND (0.012) Indicates constituent not detected above the practical quantitation limit shown in parentheses.

^a Model Toxics Control Act (MTCA) method A soil cleanup levels for direct contact pathway in unrestricted land use (Ecology 2001).

^b Samples analyzed using NWTPH-Gx test method.

^c Samples analyzed using U.S. EPA 8021B test method.

^d MTCA method A soil cleanup level for gasoline mixtures containing benzene.

Ground Water Analytical Results

Analytical results of the ground water sample collected from monitoring well FC3 during this investigation and previous sampling events are summarized in Table 2. No gasoline constituents, including benzene, were detected above practical quantitation limits in ground water from FC3.

Table 2. Summary of petroleum hydrocarbons and BTEX results of ground water samples collected from well FC3, Federal Center South, Seattle, Washington (µg/L).

| Sample Identification (Sample Date) | Gasoline-range hydrocarbons ^b | Diesel-range hydrocarbons ^c | Heavy oil-range hydrocarbons ^c | Benzene ^d | Toluene ^d | Ethylbenzene ^d | Xylenes ^d |
|--|---|---|--|----------------------|----------------------|---------------------------|----------------------|
| <i>MTCA method A cleanup level^a</i> | <i>800^c</i> | <i>500</i> | <i>500</i> | <i>5</i> | <i>1,000</i> | <i>700</i> | <i>1,000</i> |
| FC3-1 (7/6/99) | ND (100) | ND (250) | ND (500) | 3.5 | ND (1.0) | ND (1.0) | ND (1.0) |
| FC3-2 (10/13/99) | ND (100) | ND (250) | ND (500) | 3.0 | ND (1.0) | ND (1.0) | ND (1.0) |
| FC3-3 (1/12/00) | ND (100) | 390 | 630 | 2.9 | ND (1.0) | ND (1.0) | ND (1.0) |
| FC3-4 (4/19/00) | ND (100) | ND (250) | ND (500) | 4.5 | ND (1.0) | ND (1.0) | ND (1.0) |
| FC3-5 (7/20/00) | ND (100) | ND (250) | ND (500) | 1.3 | ND (1.0) | ND (1.0) | ND (1.0) |
| FC3-6 (10/26/00) | ND (100) | ND (250) | ND (500) | 6.1 | ND (1.0) | ND (1.0) | ND (1.0) |
| FC3-7 (1/24/01) | ND (100) | ND (250) | ND (500) | 4.0 | ND (1.0) | ND (1.0) | ND (1.0) |
| FC3-8 (4/26/01) | ND (100) | ND (250) | ND (500) | 7.7 | ND (1.0) | ND (1.0) | ND (1.0) |
| FC3-9 (7/26/01) | ND (100) | ND (250) | ND (500) | 6.1 | ND (1.0) | ND (1.0) | ND (1.0) |
| FC3-10 (10/25/01) | ND (100) | ND (250) | ND (500) | 3.6 | ND (1.0) | ND (1.0) | ND (1.0) |
| FC3-11 (1/24/02) | ND (100) | ND (250) | ND (500) | 1.9 | ND (1.0) | ND (1.0) | ND (1.0) |
| FC3-12 (4/18/02) | ND (100) | ND (250) | ND (400) | 1.7 | ND (1.0) | ND (1.0) | ND (1.0) |
| FC3-13 (2/18/04) | ND(100) | NA | NA | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) |

Values in **boldface** type exceed MTCA method A soil cleanup levels.

ND (10) Indicates constituent not found above the practical quantitation limit shown in parentheses.

NA Sample was not analyzed for this constituent.

^a Model Toxics Control Act (MTCA) cleanup regulation (Ecology 2001).

^b Samples analyzed using NWTPH-Gx test method.

^c Samples analyzed using NWTPH-Dx test method.

^d Samples analyzed using U.S. EPA 8021B test method.

Conclusions

The results of the February 2004 site characterization conducted at Federal Center South facility indicated a localized pocket of gasoline-contaminated soil was left in-place immediately adjacent and downgradient of the former tank excavation. Analytical results indicated gasoline, benzene, ethylbenzene, and xylenes were found at concentrations exceeding MTCA method A soil cleanup levels in soil collected at 4.5 feet bgs in boring GP3. No gasoline constituents were detected above practical quantitation limits in soil samples collected from borings drilled 10 feet away and downgradient of GP3. Based on field screening and analytical results of soil samples collected at nearby borings, residual gasoline-contaminated soil appears to be limited to the vicinity of GP3 immediately adjacent to the former excavation, within the vadose zone immediately above the water table extending from 3 to 5 feet below ground surface, and covering an area of approximately 5 feet by 15 feet (Figure 3). Based on these dimensions, the estimated volume of gasoline-contaminated soil is approximately 6 cubic yards.

Benzene was not detected above the practical quantitation limit in ground water collected in February 2004 from well FC3. Sampling results from this well now indicate concentrations below the MTCA method A cleanup criteria for gasoline-range hydrocarbons and BTEX for the past four consecutive monitoring periods.

Recommendations

Prior to conducting this field effort, GSA entered into the Voluntary Cleanup Program with Ecology to expedite review of this project. Brian Sato (425-649-7265) has been assigned by Ecology as the project manager and a Herrera representative discussed the analytical results presented in this report with him on July 1, 2004, to determine requirements necessary to receive a no further action (NFA) required from Ecology. Based on the phone discussion, GSA has three alternatives:

- **Institutional Controls** (no further remediation performed):
 - If no additional excavation is performed, GSA may enter into an agreement with Ecology to implement institutional controls and Ecology would issue a NFA letter. The residual contamination would likely biodegrade by natural attenuation, but sampling at a later date(s) would be required to remove the institutional controls.
- **Additional site remediation and sampling:**
 - Remove approximately 6 cubic yards of gasoline contaminated soil from around boring GP-3 (Figure 3) and collect confirmation soil samples at the base and walls of the excavation.
 - Remove well FC9 and approximately 12 cubic yards of contaminated soil (heavy oil-range petroleum hydrocarbons) from around the well. The source of contaminated soil in this area is unknown and does not appear to be connected to the gasoline UST. The residual soil contamination has caused heavy oil-range petroleum hydrocarbon contamination in ground water exceeding MTCA method A cleanup criteria in well FC9. Because well FC9 is located within 10 feet of the residual soil contamination detected in September 2002 (Herrera 2003), it should be removed and replaced with another well located downgradient of the proposed excavation. Collect confirmation soil samples at the base and walls of the excavation, replace the monitoring well, and monitor for four quarters.
 - Abandon nine monitoring wells (including well FC9) located east of Building 12.03 (Figure 2) according to Ecology requirements (Chapter 173-162 WAC).
- **No action:**
 - Residual contamination would likely biodegrade by natural attenuation, but sampling would be required to demonstrate clean closure.

References

Ecology. 1990. Minimum Standards for Construction and Maintenance of Wells. Chapter 173-160 WAC. Amended September 2, 1998.

Ecology. 2001. Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC. Washington State Department of Ecology, Toxics Cleanup Program. Publication no. 94-06. Amended February 21, 2001.

Herrera Environmental Consultants (Herrera). 1999. Underground Storage Tank Site Assessment for Federal Center South, Seattle, Washington. Report prepared for U.S. General Services Administration. May 3, 1999.

Herrera Environmental Consultants (Herrera). 2000. Environmental Site Assessment and Ground Water Monitoring—Federal Center South, 4735 East Marginal Way South, Seattle, Washington. Report prepared for U.S. General Services Administration. January 7, 2000.

Herrera Environmental Consultants (Herrera). 2001. Baseline Ground Water Monitoring—Federal Center South, 4735 East Marginal Way South, Seattle, Washington. Report prepared for U.S. General Services Administration. December 11, 2001.

Herrera Environmental Consultants (Herrera). 2003. Independent Remedial Action Report—Federal Center South, 4735 East Marginal Way South, Seattle, Washington. Report prepared for U.S. General Services Administration. July 17, 2003.

USGS. 1983. Seattle South, Washington. Topographic-bathymetric 7.5- by 15-minute quadrangle map (N4730-W12215/7.5x15). U.S. Geological Survey, Denver, Colorado.

APPENDIX A

Field Procedures

Field Procedures

This appendix documents the field procedures used to perform the site investigation described in this report. The discussion includes information on the following subjects:

- Drilling and soil sampling via push-probe drilling method
- Ground water sampling procedures at monitoring wells
- Sample jars, sample handling, and chain-of-custody procedures
- Field equipment decontamination procedures
- Investigation-derived waste disposal.

Sample Designation

Samples were designated by a four-digit alphanumeric system referencing the general site location and sample number within the location. Soil samples collected from the probe borings received an additional suffix denoting the depth of the sample interval. For example:

- GP3-4.5 denotes the soil sample collected at probe boring location 3, starting at depth of 4.5 feet
- FC3 denotes the water sample collected from existing monitoring well location 3.

Sampling Procedures

Pre-Drilling Activities

Prior to commencing drilling activities, a private utility locating company, Applied Professional Services, Inc. of Issaquah, Washington, was retained to locate underground utilities at each proposed boring location situated on private property. Facility plan drawings also were reviewed, as supplied by U.S. GSA.

Soil Sampling from Probe-Drilled Borings

Probe borings were advanced using a probe-drive sampler attached to driven probe rods. All 14 boring locations were drilled to a maximum depth of 8 feet below ground surface, when ground water was encountered. During drilling, discrete soil samples for soil classification, field screening, and chemical analysis were collected continuously at 4-foot intervals using a probe-drive sampler 4 feet long by 2 inches outside diameter and lined with dedicated clear Lexan[®] liners. The sampler was sealed with a piston stop pin while being pushed or driven to the desired sampling depth. The piston stop pin was retracted into the sampler while the sampler was

pushed or driven to obtain a soil sample. Following retrieval, the soil-filled Lexan[®] liner was removed from the sampler and cut open to expose the soil core. Soil encountered during drilling was visually inspected for staining, classified in accordance with the Unified Soil Classification System (USCS; American Society for Testing and Materials [ASTM] D2488-90), and observed for soil coloration using the Munsell[®] Soil Color Charts (U.S. Department of Agriculture [USDA] Handbook 18—Soil Survey Manual).

Soil samples were field-screened for the presence of volatile organic vapors using a Photovac[®] Microtip 2020 photoionization detector (PID). The PID is designed to detect and measure volatile organic compound vapors in air. The PID was calibrated in the field using 100 parts per million (ppm) isobutylene standard gas. Pertinent geologic and hydrogeologic subsurface conditions and PID readings were recorded on soil probe boring logs.

Samples were prepared for chemical analysis by removing soil from the liner and placement directly into jars provided by the analytical laboratory. Each sample was uniquely labeled denoting sample identification number and depth, date and time sampled, and job number. Soil samples were then placed into a chilled cooler for storage prior to delivery to the analytical laboratory.

After soil sampling was completed, each probe borehole was backfilled from the bottom to the ground surface with bentonite chips and then capped at the surface with asphalt.

Ground Water Sampling from Monitoring Wells

General procedures for collecting ground water samples from monitoring wells were as follows:

1. Remove the well monument cover and inspect the condition of the well and surrounding area. Note observations in the field notebook and well sampling log. Unlock and remove the well casing plug.
2. Using an electronic water level indicator, the depth to ground water was measured to the nearest 0.01 feet. Measurements were taken relative to the surveyed reference mark at the top of the PVC well casing. Date, time, and measurements were recorded in the field notebook and well sampling log.
3. The well was purged of standing water using a dedicated disposable high-density polyethylene bailer attached to clean nylon twine that was lowered into the well to the screened interval. During purging, pH, water temperature, and specific conductivity were measured. The amount of water purged, water parameter measurements, and time of collection were recorded in the well sampling log. The well was purged until field readings had stabilized, with a minimum of three casing volumes of standing water removed prior to sampling. Purged water removed during

development at monitoring well FC3 was contained in 5-gallon lidded plastic buckets temporarily stored onsite along the fence near well FC1.

4. Following purging, samples were collected using the same dedicated disposable bailer used to purge the well. Samples were collected by gently lowering the bailer into the well, retrieving the bailer to the surface, and pouring the contents of the bailer directly into sample containers provided by the analytical laboratory. Care was taken to ensure that no bubbles or headspace were present. Containers were securely capped, labeled, and placed into a chilled cooler for storage prior to delivery to the laboratory. The date and time sample collected was recorded in the field notebook, well sampling log, and on the chain-of-custody form.
5. The well casing plug was replaced and locked, and the well monument cover was secured.

Decontamination Procedures

Decontamination was performed on all sampling equipment potentially exposed to contaminated soil and ground water prior to leaving each area of concern. All sampling equipment, except for Lexan® liners and disposable bailers, was decontaminated prior to entry in the field. In addition, chemical-resistant gloves worn by sample handlers were changed between sampling locations.

Decontamination of Soil Sampling Equipment

The following decontamination procedure was used for soil sampling equipment, including push-probe drive sampler and probe drive rods:

- Rinse with tap water
- Scrub with water and Alconox detergent
- Rinse with tap water
- Rinse with deionized water
- Air dry thoroughly.

The electronic water level indicator, pH, and conductivity meters were rinsed with deionized water between uses at different sampling locations.

Decontamination of Drilling Equipment

Drilling equipment, including sections of push-drive probe rods, were decontaminated between boring locations using a high-temperature pressure washer.

Sample Handling

All samples collected during this investigation were handled according to the procedures described in this section.

Sample Containers and Labeling

Samples were placed in containers supplied by the analytical laboratory appropriate for the analyses to be performed. Sample container labels were completed at the time of collection using a permanent waterproof pen or marker. Sample labels included the following information:

- Site name
- Project ID name and number
- Sample ID (including depth interval collected where appropriate)
- General analysis to be performed
- Date and time of collection (for each sample).

Sample Storage

Immediately following sample collection, sample containers were placed into a chilled cooler for storage prior to and during delivery to the analytical laboratory. Care was taken to ensure that sample holding times were not exceeded during periods of storage. Sample containers were placed into plastic Ziploc® bags to protect labels from moisture in the cooler.

Chain of Custody

Following collection, sample information was recorded on a chain-of-custody form. The purpose of this record is to account for the possession (or custody) of each sample from the time it is collected until laboratory testing and reporting is complete. The signature of each person in possession of the samples must be recorded on the chain-of-custody form. Information recorded on the chain-of-custody record included the following:

- Project name and location
- Project number
- Names of project manager and sampling personnel
- Sample identification
- Sample matrix (soil or water)
- Date and time of collection (for each sample)
- Number of sample containers (for each sample)
- Analysis requested (for each sample)
- Signature, date, and time (for each person releasing or accepting sample custody).

Sample Shipment and Delivery

Samples collected during this investigation were hand-delivered to the analytical laboratory.

Sample Documentation

All sampling activities conducted for this investigation were documented in a dedicated field notebook. The notebook was labeled with the project name, project identification number, dates of field activities, and name and business address of the field coordinator. All relevant activities will be recorded in the field notebook during the period of the field investigation. Entries into the field notebook were made in permanent ink. Corrections were made by placing a single line through the original entry accompanied by the initials of the person entering the correction. At a minimum, information in the field notebook included:

- Date and atmospheric weather conditions
- Major activities to be performed
- Names of sampling personnel present (including subcontractors)
- Time of arrival at site, set-up, sample collection, and completion at each sample station
- General condition of sampling area
- Soil descriptions (except where recorded on boring logs)
- Start and stop times of work by subcontractors
- Any unusual events or occurrences.

Disposal of Investigation-Derived Waste

Disposal of Incidental Trash

Incidental trash generated during this investigation (including discarded nitrile gloves, used Ziploc[®] bags, paper towels, used Lexan[®] liners, disposable bailers) was placed in plastic trash bags and disposed of as solid waste into a dumpster at Cascade Drilling, Inc. facility in Woodinville, Washington.

Disposal of Soil Cuttings

Soil cuttings generated during soil probe sampling were placed in two 5-gallon lidded plastic buckets and stored along the fence and western property boundary near monitoring well FC1

until analytical results of soil samples from respective borings are available to determine appropriate disposal requirements. The buckets were labeled with the source location and matrix stored, plus a designation of potentially hazardous material. Based on analytical results the buckets were disposed of at the Rabanco facility in Seattle, Washington. Documentation of waste disposal is provided in Appendix D of the main report.

Purge Water Disposal

Purge water generated during sampling activities at well FC3 was secured in a 5-gallon lidded plastic bucket and temporarily stored along the fence and western property boundary near monitoring well FC1. No gasoline-range petroleum hydrocarbons and BTEX were detected above the practical quantitation limit in the water sample collected from well FC3 and the buckets were emptied on the ground, adjacent to well FC1.

Decontamination Water Disposal

Decontamination solutions and rinse water were combined with other water to be placed on the ground at probe boreholes to hydrate bentonite chips used to backfill the boreholes.

APPENDIX B

Probe Boring Logs



SOIL BORING RECORD

Boring # GP1
 Total depth 8 feet
 Sheet 1 of 1

Project name FEDMON4 Drilling Contractor Cascade Drilling, Inc. Drilling method Push probe drill rig
 Project number C00-01419-057 Location North adjacent to the former Sampling method 4-foot probe sampler
 Client U.S. GSA gasoline tank excavation Ground elevation N/A
 HEC rep. Diana Phelan Start date 2/18/04 Air monitoring (Y/N) Yes
 Compl. date 2/18/04 Instrument(s) Microtip 2020 PID

| Instrument reading (ppm) | Sample type, interval | % recovery | Water level (feet) | Depth (feet, BGS) | Soil group | Soil description |
|--------------------------|---------------------------|------------|--------------------|-------------------|------------|---|
| 1154 | 4-foot long probe sampler | 100 | ▽ | 1 | | 8-inch asphalt and crushed gravel base |
| | | | | 2 | SP | Olive brown (2.5Y 4/3) fine- to medium-grained SAND, with trace amounts of silt, moist |
| | | | | 3 | SP | Very dark gray (2.5Y 3/1) fine-grained SAND, moist |
| | | | | 4 | | |
| 951 | 4-foot long probe sampler | 100 | | 5 | SP | Same as above, moist to wet, slight hydrocarbon odor noted Ground water encountered during drilling at 5.5 feet below ground surface |
| | | | | 6 | | |
| | | | | 7 | | |
| | | | | 8 | | |
| | | | | 9 | | Boring drilled to 8.0 feet; backfilled borehole with bentonite chip seal and capped at the surface with asphalt patch. |
| | | | | 10 | | |
| | | | | 11 | | |
| | | | | 12 | | |
| | | | | 13 | | |
| | | | | 14 | | |
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| | | | | 19 | | |
| | | | | 20 | | |



SOIL BORING RECORD

Boring # GP2
 Total depth 8 feet
 Sheet 1 of 1

Project name FEDMON4 Drilling Contractor Cascade Drilling, Inc. Drilling method Push probe drill rig
 Project number C00-01419-057 Location Northwest adjacent to the Sampling method 4-foot probe sampler
 Client U.S. GSA former gasoline tank excavation Ground elevation N/A
 HEC rep. Diana Phelan Start date 2/18/04 Air monitoring (Y/N) Yes
 Compl. date 2/18/04 Instrument(s) Microtip 2020 PID

| Instrument reading (ppm) | Sample type, interval | % recovery | Water level (feet) | Depth (feet, BGS) | Soil group | Soil description |
|--------------------------|---------------------------|------------|--------------------|-------------------|------------|--|
| | | | | 1 | | Asphalt and crushed gravel base |
| | 4-foot long probe sampler | 100 | | 2 | SP | Olive brown (2.5Y 4/3) fine- to medium-grained SAND, moist |
| 298 | | | | 3 | | |
| | | | | 4 | SP | Very dark gray (2.5Y 3/1) fine-grained SAND, moist to wet |
| 339 | 4-foot long probe sampler | 100 | ▽ | 5 | SP | Same as above, wet |
| | | | | 6 | | Ground water encountered during drilling at 5.4 feet below ground surface |
| | | | | 7 | | |
| | | | | 8 | | |
| | | | | 9 | | Boring drilled to 8.0 feet; backfilled borehole with bentonite chip seal and capped at the surface with asphalt patch. |
| | | | | 10 | | |
| | | | | 11 | | |
| | | | | 12 | | |
| | | | | 13 | | |
| | | | | 14 | | |
| | | | | 15 | | |
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| | | | | 19 | | |
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SOIL BORING RECORD

Boring # GP3
 Total depth 8 feet
 Sheet 1 of 1

Project name FEDMON4 Drilling Contractor Cascade Drilling, Inc. Drilling method Push probe drill rig
 Project number C00-01419-057 Location West-center adjacent to the Sampling method 4-foot probe sampler
 Client U.S. GSA former gasoline tank excavation Ground elevation N/A
 HEC rep. Diana Phelan Start date 2/18/04 Air monitoring (Y/N) Yes
 Compl. date 2/18/04 Instrument(s) Microtip 2020 PID

| Instrument reading (ppm) | Sample type, interval | % recovery | Water level (feet) | Depth (feet, BGS) | Soil group | Soil description |
|--------------------------|---------------------------|------------|--------------------|-------------------|------------|--|
| 478 | 4-foot long probe sampler | 100 | ▽ | 1 | | Asphalt and crushed gravel base |
| | | | | 2 | SP | Olive brown (2.5Y 4/3) fine- to medium-grained SAND, occasional gravel, moist |
| | | | | 3 | SP | Very dark gray (2.5Y 3/1) fine-grained SAND, moist |
| | | | | 4 | | |
| >2,000 | 4-foot long probe sampler | 75 | | 5 | SP | Black (2.5Y 2.5/1) fine-grained SAND, moist to wet, visible oily sheen and hydrocarbon odor noted Ground water encountered during drilling at 5.5 feet below ground surface |
| | | | | 6 | | |
| | | | | 7 | | |
| | | | | 8 | | |
| | | | | 9 | | Boring drilled to 8.0 feet; backfilled borehole with bentonite chip seal and capped at the surface with asphalt patch. |
| | | | | 10 | | |
| | | | | 11 | | |
| | | | | 12 | | |
| | | | | 13 | | |
| | | | | 14 | | |
| | | | | 15 | | |
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| | | | | 19 | | |
| | | | | 20 | | |



SOIL BORING RECORD

Boring # GP4
 Total depth 8 feet
 Sheet 1 of 1

Project name FEDMON4 Drilling Contractor Cascade Drilling, Inc. Drilling method Push probe drill rig
 Project number C00-01419-057 Location Southwest adjacent to the Sampling method 4-foot probe sampler
 Client U.S. GSA former gasoline tank excavation Ground elevation N/A
 HEC rep. Diana Phelan Start date 2/18/04 Air monitoring (Y/N) Yes
 Compl. date 2/18/04 Instrument(s) Microtip 2020 PID

| Instrument reading (ppm) | Sample type, interval | % recovery | Water level (feet) | Depth (feet, BGS) | Soil group | Soil description |
|--------------------------|---------------------------|------------|--------------------|-------------------|------------|--|
| | | | | 1 | | Asphalt and crushed gravel base |
| 77.2 | 4-foot long probe sampler | 100 | ▽ | 2 | SP | Olive brown (2.5Y 4/3) fine- to medium-grained SAND, occasional gravel, moist |
| | | | | 3 | SP | Very dark gray (2.5Y 3/1) fine- to medium-grained SAND, moist to wet |
| | | | | 4 | | Ground water encountered during drilling at 4.0 feet below ground surface |
| 114 | 4-foot long probe sampler | 75 | | 5 | SP | Same as above, black (2.5Y 2.5/1), wet |
| | | | | 6 | | |
| | | | | 7 | | |
| | | | | 8 | | |
| | | | | 9 | | Boring drilled to 8.0 feet; backfilled borehole with bentonite chip seal and capped at the surface with asphalt patch. |
| | | | | 10 | | |
| | | | | 11 | | |
| | | | | 12 | | |
| | | | | 13 | | |
| | | | | 14 | | |
| | | | | 15 | | |
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| | | | | 19 | | |
| | | | | 20 | | |



SOIL BORING RECORD

Boring # GP5
 Total depth 8 feet
 Sheet 1 of 1

Project name FEDMON4 Drilling Contractor Cascade Drilling, Inc. Drilling method Push probe drill rig
 Project number C00-01419-057 Location South adjacent to the Sampling method 4-foot probe sampler
 Client U.S. GSA former gasoline tank excavation Ground elevation N/A
 HEC rep. Diana Phelan Start date 2/18/04 Air monitoring (Y/N) Yes
 Compl. date 2/18/04 Instrument(s) Microtip 2020 PID

| Instrument reading (ppm) | Sample type, interval | % recovery | Water level (feet) | Depth (feet, BGS) | Soil group | Soil description |
|--------------------------|---------------------------|------------|--------------------|-------------------|------------|--|
| 479 | 4-foot long probe sampler | 80 | ▽ | 1 | | Asphalt and crushed gravel base |
| | | | | 2 | SP | Olive brown (2.5Y 4/3) fine- to medium-grained SAND, occasional gravel, moist |
| | | | | 3 | SP | Very dark gray (2.5Y 3/1) fine- to medium-grained SAND, moist, slight hydrocarbon odor noted |
| | | | | 4 | SP | Olive brown (2.5Y 4/3) fine- to medium-grained SAND, moist |
| 252 | 4-foot long probe sampler | 75 | | 5 | SP | Ground water encountered during drilling at 4.8 feet below ground surface |
| | | | | 6 | | Very dark gray (2.5Y 3/1) fine-grained SAND, wet |
| | | | | 7 | | |
| | | | | 8 | | |
| | | | | 9 | | Boring drilled to 8.0 feet; backfilled borehole with bentonite chip seal and capped at the surface with asphalt patch. |
| | | | | 10 | | |
| | | | | 11 | | |
| | | | | 12 | | |
| | | | | 13 | | |
| | | | | 14 | | |
| | | | | 15 | | |
| | | | | 16 | | |
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| | | | | 18 | | |
| | | | | 19 | | |
| | | | | 20 | | |



SOIL BORING RECORD

Boring # GP6
 Total depth 8 feet
 Sheet 1 of 1

Project name FEDMON4 Drilling Contractor Cascade Drilling, Inc. Drilling method Push probe drill rig
 Project number C00-01419-057 Location 10 ft. west of former gasoline tank excavation; between GP2 and GP3 Sampling method 4-foot probe sampler
 Client U.S. GSA Ground elevation N/A
 HEC rep. Diana Phelan Start date 2/18/04 Air monitoring (Y/N) Yes
 Compl. date 2/18/04 Instrument(s) Microtip 2020 PID

| Instrument reading (ppm) | Sample type, interval | % recovery | Water level (feet) | Depth (feet, BGS) | Soil group | Soil description |
|--------------------------|---------------------------|------------|--------------------|-------------------|------------|--|
| 626 | 4-foot long probe sampler | 100 | <div>▽</div> | 1 | | Asphalt and crushed gravel base |
| | | | | 2 | SP | Olive brown (2.5Y 4/3) fine- to medium-grained SAND, occasional gravel, moist |
| | | | | 3 | SP | Very dark gray (2.5Y 3/1) fine-grained SAND, moist |
| | | | | 4 | | |
| 141 | 4-foot long probe sampler | 100 | | 5 | SP/SM | Very dark gray (2.5Y 3/1) and olive brown (2.5Y 4/3) fine-grained SAND to silty fine-grained SAND, moist to wet |
| | | | | 6 | | Ground water encountered during drilling at 5.3 feet below ground surface |
| | | | | 7 | SP | Black (2.5Y 2.5/1) fine- to medium-grained SAND, wet |
| | | | | 8 | | |
| | | | | 9 | | Boring drilled to 8.0 feet; backfilled borehole with bentonite chip seal and capped at the surface with asphalt patch. |
| | | | | 10 | | |
| | | | | 11 | | |
| | | | | 12 | | |
| | | | | 13 | | |
| | | | | 14 | | |
| | | | | 15 | | |
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| | | | | 18 | | |
| | | | | 19 | | |
| | | | | 20 | | |



SOIL BORING RECORD

Boring # GP7
 Total depth 8 feet
 Sheet 1 of 1

Project name FEDMON4 Drilling Contractor Cascade Drilling, Inc. Drilling method Push probe drill rig
 Project number C00-01419-057 Location 10 ft. west of former gasoline Sampling method 4-foot probe sampler
 Client U.S. GSA tank excavation; between GP3 and GP4 Ground elevation N/A
 HEC rep. Diana Phelan Start date 2/18/04 Air monitoring (Y/N) Yes
 Compl. date 2/18/04 Instrument(s) Microtip 2020 PID

| Instrument reading (ppm) | Sample type, interval | % recovery | Water level (feet) | Depth (feet, BGS) | Soil group | Soil description |
|--------------------------|---------------------------|------------|--------------------|-------------------|------------|--|
| | | | | 1 | | Asphalt and crushed gravel base |
| 0.0 | 4-foot long probe sampler | 80 | ▽ | 2 | SP | Olive brown (2.5Y 4/3) fine- to medium-grained SAND, moist |
| | | | | 3 | SP | Very dark gray (2.5Y 3/1) fine-grained SAND, moist |
| 0.0 | | | | 4 | | Ground water encountered during drilling at 4.5 feet below ground surface |
| | 4-foot long probe sampler | 100 | | 5 | SP | Very dark brown (10YR 2/2) fine- to medium-grained SAND, moist to wet |
| | | | | 6 | | |
| | | | | 7 | SP | Black (2.5Y 2.5/1) fine- to medium-grained SAND, wet |
| | | | | 8 | | |
| | | | | 9 | | Boring drilled to 8.0 feet; backfilled borehole with bentonite chip seal and capped at the surface with asphalt patch. |
| | | | | 10 | | |
| | | | | 11 | | |
| | | | | 12 | | |
| | | | | 13 | | |
| | | | | 14 | | |
| | | | | 15 | | |
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| | | | | 19 | | |
| | | | | 20 | | |



SOIL BORING RECORD

Boring # GP8
 Total depth 8 feet
 Sheet 1 of 1

Project name FEDMON4 Drilling Contractor Cascade Drilling, Inc. Drilling method Push probe drill rig
 Project number C00-01419-057 Location 10 ft. south and 10 ft. west of Sampling method 4-foot probe sampler
 Client U.S. GSA NW corner of the former tank excavation Ground elevation N/A
 HEC rep. Diana Phelan Start date 2/18/04 Air monitoring (Y/N) Yes
 Compl. date 2/18/04 Instrument(s) Microtip 2020 PID

| Instrument reading (ppm) | Sample type, interval | % recovery | Water level (feet) | Depth (feet, BGS) | Soil group | Soil description |
|--------------------------|---------------------------|--|--------------------|-------------------|------------|--|
| 0.0 | 4-foot long probe sampler | 90 | ▽ | 1 | | Asphalt and crushed gravel base |
| | | | | 2 | SP | Olive brown (2.5Y 4/3) fine- to medium-grained SAND, moist |
| | | | | 3 | | |
| 4 | SP | Very dark gray (2.5Y 3/1) fine-grained SAND, moist to wet Ground water encountered during drilling at 5.5 feet below ground surface | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 0.0 | 4-foot long probe sampler | 100 | | 8 | | |
| | | | | 9 | | Boring drilled to 8.0 feet; backfilled borehole with bentonite chip seal and capped at the surface with asphalt patch. |
| | | | | 10 | | |
| | | | | 11 | | |
| | | | | 12 | | |
| | | | | 13 | | |
| | | | | 14 | | |
| | | | | 15 | | |
| | | | | 16 | | |
| | | | | 17 | | |
| | | | | 18 | | |
| | | | | 19 | | |
| | | | | 20 | | |



SOIL BORING RECORD

Boring # GP9
 Total depth 8 feet
 Sheet 1 of 1

Project name FEDMON4 Drilling Contractor Cascade Drilling, Inc. Drilling method Push probe drill rig
 Project number C00-01419-057 Location 10 ft. west of the former tank Sampling method 4-foot probe sampler
 Client U.S. GSA excavation; between GP6 and GP7 Ground elevation N/A
 HEC rep. Diana Phelan Start date 2/18/04 Air monitoring (Y/N) Yes
 Compl. date 2/18/04 Instrument(s) Microtip 2020 PID

| Instrument reading (ppm) | Sample type, interval | % recovery | Water level (feet) | Depth (feet, BGS) | Soil group | Soil description |
|--------------------------|---------------------------|------------|--------------------|-------------------|------------|--|
| | | | | 1 | | Asphalt and crushed gravel base |
| 366 | 4-foot long probe sampler | 90 | ▽ | 2 | SP | Olive brown (2.5Y 4/3) fine- to medium-grained SAND, moist |
| | | | | 3 | | Same as above, gravels |
| | | | | 4 | | Ground water encountered during drilling at 5.5 feet below ground surface |
| 244 | 4-foot long probe sampler | 100 | | 5 | SP | Very dark gray (2.5Y 3/1) fine-grained SAND, moist to wet |
| | | | | 6 | | |
| | | | | 7 | | |
| | | | | 8 | | |
| | | | | 9 | | Boring drilled to 8.0 feet; backfilled borehole with bentonite chip seal and capped at the surface with asphalt patch. |
| | | | | 10 | | |
| | | | | 11 | | |
| | | | | 12 | | |
| | | | | 13 | | |
| | | | | 14 | | |
| | | | | 15 | | |
| | | | | 16 | | |
| | | | | 17 | | |
| | | | | 18 | | |
| | | | | 19 | | |
| | | | | 20 | | |



SOIL BORING RECORD

Boring # GP10
 Total depth 8 feet
 Sheet 1 of 1

Project name FEDMON4 Drilling Contractor Cascade Drilling, Inc. Drilling method Push probe drill rig
 Project number C00-01419-057 Location 10 ft. west between GP7 and GP9; 20 ft. west of the tank excavation Sampling method 4-foot probe sampler
 Client U.S. GSA Ground elevation N/A
 HEC rep. Diana Phelan Start date 2/18/04 Air monitoring (Y/N) Yes
 Compl. date 2/18/04 Instrument(s) Microtip 2020 PID

| Instrument reading (ppm) | Sample type, interval | % recovery | Water level (feet) | Depth (feet, BGS) | Soil group | Soil description |
|--------------------------|---------------------------|------------|--------------------|-------------------|------------|--|
| | | | | 1 | | Asphalt and crushed gravel base |
| 0.0 | 4-foot long probe sampler | 75 | | 2 | SP | Olive brown (2.5Y 4/3) fine- to medium-grained SAND, moist |
| | | | | 3 | | |
| | | | | 4 | | |
| 0.0 | | | ▽ | 5 | | Ground water encountered during drilling at 4.7 feet below ground surface |
| | 4-foot long probe sampler | 80 | | 6 | SP | Very dark gray (2.5Y 3/1) to black (2.5Y 2.5/1) fine-grained SAND, wet |
| | | | | 7 | | |
| | | | | 8 | | |
| | | | | 9 | | Boring drilled to 8.0 feet; backfilled borehole with bentonite chip seal and capped at the surface with asphalt patch. |
| | | | | 10 | | |
| | | | | 11 | | |
| | | | | 12 | | |
| | | | | 13 | | |
| | | | | 14 | | |
| | | | | 15 | | |
| | | | | 16 | | |
| | | | | 17 | | |
| | | | | 18 | | |
| | | | | 19 | | |
| | | | | 20 | | |



SOIL BORING RECORD

Boring # GP11
 Total depth 8 feet
 Sheet 1 of 1

Project name FEDMON4 Drilling Contractor Cascade Drilling, Inc. Drilling method Push probe drill rig
 Project number C00-01419-057 Location 2 ft. north of NW corner of the Sampling method 4-foot probe sampler
 Client U.S. GSA former tank excavation Ground elevation N/A
 HEC rep. Diana Phelan Start date 2/18/04 Air monitoring (Y/N) Yes
 Compl. date 2/18/04 Instrument(s) Microtip 2020 PID

| Instrument reading (ppm) | Sample type, interval | % recovery | Water level (feet) | Depth (feet, BGS) | Soil group | Soil description |
|--------------------------|---------------------------|------------|--------------------|-------------------|------------|--|
| | | | | 1 | | Asphalt and crushed gravel base |
| 0.0 | 4-foot long probe sampler | 75 | | 2 | SP | Olive brown (2.5Y 4/3) fine- to medium-grained SAND, moist |
| | | | | 3 | | |
| 0.0 | 4-foot long probe sampler | 80 | ▽ | 4 | SP | Very dark gray (2.5Y 3/1) to black (2.5Y 2.5/1) fine-grained SAND, moist to wet |
| | | | | 5 | | Ground water encountered during drilling at 5.5 feet below ground surface |
| | | | | 6 | | |
| | | | | 7 | | |
| | | | | 8 | | |
| | | | | 9 | | Boring drilled to 8.0 feet; backfilled borehole with bentonite chip seal and capped at the surface with asphalt patch. |
| | | | | 10 | | |
| | | | | 11 | | |
| | | | | 12 | | |
| | | | | 13 | | |
| | | | | 14 | | |
| | | | | 15 | | |
| | | | | 16 | | |
| | | | | 17 | | |
| | | | | 18 | | |
| | | | | 19 | | |
| | | | | 20 | | |



SOIL BORING RECORD

Boring # GP12
 Total depth 8 feet
 Sheet 1 of 1

Project name FEDMON4 Drilling Contractor Cascade Drilling, Inc. Drilling method Push probe drill rig
 Project number C00-01419-057 Location 13 ft. south of SW corner of the Sampling method 4-foot probe sampler
 Client U.S. GSA former tank excavation Ground elevation N/A
 HEC rep. Diana Phelan Start date 2/18/04 Air monitoring (Y/N) Yes
 Compl. date 2/18/04 Instrument(s) Microtip 2020 PID

| Instrument reading (ppm) | Sample type, interval | % recovery | Water level (feet) | Depth (feet, BGS) | Soil group | Soil description |
|--------------------------|---------------------------|------------|--------------------|-------------------|------------|--|
| | | | | 1 | | Asphalt and crushed gravel base |
| 0.0 | 4-foot long probe sampler | 75 | | 2 | SP | Olive brown (2.5Y 4/3) fine- to medium-grained SAND, moist |
| | | | | 3 | SP | Very dark gray (2.5Y 3/1) fine-grained SAND, moist |
| | | | | 4 | | |
| 0.0 | 4-foot long probe sampler | 80 | ▽ | 5 | | Ground water encountered during drilling at 4.5 feet below ground surface |
| | | | | 6 | SP | Same as above, black (2.5Y 2.5/1), wet |
| | | | | 7 | | |
| | | | | 8 | | |
| | | | | 9 | | Boring drilled to 8.0 feet; backfilled borehole with bentonite chip seal and capped at the surface with asphalt patch. |
| | | | | 10 | | |
| | | | | 11 | | |
| | | | | 12 | | |
| | | | | 13 | | |
| | | | | 14 | | |
| | | | | 15 | | |
| | | | | 16 | | |
| | | | | 17 | | |
| | | | | 18 | | |
| | | | | 19 | | |
| | | | | 20 | | |



SOIL BORING RECORD

Boring # GP13
 Total depth 8 feet
 Sheet 1 of 1

Project name FEDMON4 Drilling Contractor Cascade Drilling, Inc. Drilling method Push probe drill rig
 Project number C00-01419-057 Location 21 ft. south GP3, adjacent to Sampling method 4-foot probe sampler
 Client U.S. GSA the former tank excavation Ground elevation N/A
 HEC rep. Diana Phelan Start date 2/18/04 Air monitoring (Y/N) Yes
 Compl. date 2/18/04 Instrument(s) Microtip 2020 PID

| Instrument reading (ppm) | Sample type, interval | % recovery | Water level (feet) | Depth (feet, BGS) | Soil group | Soil description |
|--------------------------|---------------------------|------------|--------------------|-------------------|------------|--|
| | | | | | | Asphalt and crushed gravel base |
| | | | | 1 | SP | Olive brown (2.5Y 4/3) fine- to medium-grained SAND, moist |
| | | | | 2 | SP/SP-SM | Very dark gray (2.5Y 3/1) fine-grained SAND with gravel and some silt, moist |
| 0.0 | 4-foot long probe sampler | 75 | | 3 | | |
| | | | | 4 | SP | Very dark gray (2.5Y 3/1) to black (2.5Y 2.5/1) fine-grained SAND, moist to wet |
| 0.0 | | | ▽ | 5 | | Ground water encountered during drilling at 4.5 feet below ground surface |
| | 4-foot long probe sampler | 80 | | 6 | SP | Same as above, wet |
| | | | | 7 | | |
| | | | | 8 | | |
| | | | | 9 | | Boring drilled to 8.0 feet; backfilled borehole with bentonite chip seal and capped at the surface with asphalt patch. |
| | | | | 10 | | |
| | | | | 11 | | |
| | | | | 12 | | |
| | | | | 13 | | |
| | | | | 14 | | |
| | | | | 15 | | |
| | | | | 16 | | |
| | | | | 17 | | |
| | | | | 18 | | |
| | | | | 19 | | |
| | | | | 20 | | |



SOIL BORING RECORD

Boring # GP14
 Total depth 8 feet
 Sheet 1 of 1

Project name FEDMON4 Drilling Contractor Cascade Drilling, Inc. Drilling method Push probe drill rig
 Project number C00-01419-057 Location 13 ft. west of the SW corner Sampling method 4-foot probe sampler
 Client U.S. GSA of the former tank excavation Ground elevation N/A
 HEC rep. Diana Phelan Start date 2/18/04 Air monitoring (Y/N) Yes
 Compl. date 2/18/04 Instrument(s) Microtip 2020 PID

| Instrument reading (ppm) | Sample type, interval | % recovery | Water level (feet) | Depth (feet, BGS) | Soil group | Soil description |
|--------------------------|---------------------------|------------|--------------------|-------------------|------------|--|
| | | | | 1 | | Asphalt and crushed gravel base |
| 0.0 | 4-foot long probe sampler | 75 | ▽ | 2 | SP | Olive brown (2.5Y 4/3) fine- to medium-grained SAND, moist |
| | | | | 3 | SP | Very dark gray (2.5Y 3/1) to black (2.5Y 2.5/1) fine-grained SAND, moist to wet |
| 0.0 | | | | 4 | | Ground water encountered during drilling at 4.0 feet below ground surface |
| | 4-foot long probe sampler | 80 | | 5 | SP | Same as above, wet |
| | | | | 6 | | |
| | | | | 7 | | |
| | | | | 8 | | |
| | | | | 9 | | Boring drilled to 8.0 feet; backfilled borehole with bentonite chip seal and capped at the surface with asphalt patch. |
| | | | | 10 | | |
| | | | | 11 | | |
| | | | | 12 | | |
| | | | | 13 | | |
| | | | | 14 | | |
| | | | | 15 | | |
| | | | | 16 | | |
| | | | | 17 | | |
| | | | | 18 | | |
| | | | | 19 | | |
| | | | | 20 | | |

APPENDIX C

Laboratory Analytical Report and Data Quality Assurance Review

Data Quality Assurance Review Summary

A data quality assurance review was performed on analytical data for samples collected at Federal Center South in Seattle, Washington. Herrera Environmental Consultants collected 16 soil samples and one water sample on February 18, 2004. OnSite Environmental, Inc., of Seattle, Washington analyzed the samples for gasoline and benzene, toluene, ethylbenzene, and xylenes (BTEX) using method NWTPH-Gx (Ecology 1997).

The laboratory's performance was reviewed in accordance with quality control specifications outlined by the analytical method and the U.S. Environmental Protection Agency (EPA) functional guidelines for organic data review (U.S. EPA 1999).

Quality control data submitted by the laboratory were reviewed; raw laboratory data were not provided or reviewed. Review of the laboratory report and data validation results is summarized below.

Analytical Results

Nine soil samples and one water sample were analyzed for gasoline and BTEX. The results were determined to be acceptable for use without data reviewer qualification, based on the following criteria:

Holding Times— The reported samples were extracted and analyzed within the required holding time of 14 days from collection to analysis.

Laboratory Reporting Limits— The reported practical quantitation limits (PQLs) for gasoline and BTEX were in accordance with the analytical method.

Blank Analysis— One method blank was extracted and analyzed with each sample batch. The method blank did not contain reportable levels of gasoline or BTEX above practical quantitation limits. No field blanks were collected.

Surrogate Analysis— One surrogate compound was analyzed with the samples and method blank in accordance with the method. The surrogate recovery values (ranging from 74 to 111 percent) met the control limits (50 to 150 percent) established by the method.

Duplicate Analysis— Laboratory duplicate results were reported for soil samples GP5-4 and GP6-3, and for water sample FC3. Relative percent difference (RPD) values were not calculated because gasoline and BTEX were not detected above the PQLs. No field duplicates were collected.

Matrix Spike/Matrix Spike Duplicate Analysis— Matrix spike/matrix spike duplicate (MS/MSD) results were reported for soil samples GP5-4 and GP6-3, and for a batch water sample. The percent recovery values (ranging from 79 to 101 percent) and RPD values (ranging from 0 to 1 percent) met the control limits established by the laboratory.

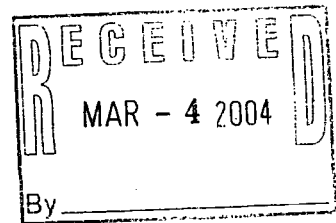
Laboratory Flags— The laboratory qualified gasoline results for samples GP1-5 and GP3-4.5 to indicate the presence of hydrocarbons outside the defined gasoline range. The laboratory qualified m,p-xylene results for sample GP3-4.5 as estimated because the reported value exceeded the quantitation range. The data reviewer did not qualify any sample results.

References

Ecology. 1997. Analytical Methods for Petroleum Hydrocarbons. Washington State Department of Ecology, Toxics Cleanup Program. Ecology publication number ECY 97-602. June 1997.

U.S. EPA. 1996. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846 Third Edition, Updates I, II, IIA, IIB, and III. Office of Solid Waste and Emergency Response. U.S. Environmental Protection Agency, Washington, D.C. December 1996.

U.S. EPA. 1999. U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review. U.S. Environmental Protection Agency, Washington, D.C. EPA 540/R-94-012, October 1999.



March 2, 2004

Bruce Carpenter
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project C00-01419-057
Laboratory Reference No. 0402-131

Dear Bruce:

Enclosed are the analytical results and associated quality control data for samples submitted on February 19, 2004.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: March 2, 2004
Samples Submitted: February 19, 2004
Laboratory Reference: 0402-131
Project: C00-01419-057

Case Narrative

Samples were collected on February 18, 2004 and received by the laboratory on February 19, 2004. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

NWTPH Gx/BTEX Analysis

Samples GP1-5 and GP3-4.5 contain hydrocarbons outside the defined gasoline range. The value for m,p-xylene reported for sample GP3-4.5 exceeds the quantitation range and is an estimate.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: March 2, 2004
Samples Submitted: February 19, 2004
Laboratory Reference: 0402-131
Project: C00-01419-057

NWTPH-Gx/BTEX

Date Extracted: 2-23-04
Date Analyzed: 2-24&25-04

Matrix: Soil
Units: mg/kg (ppm)

| | | |
|------------|--------------|--------------|
| Client ID: | GP1-5 | GP2-5 |
| Lab ID: | 02-131-01 | 02-131-02 |

| | Result | Flags | PQL | Result | Flags | PQL |
|---------------------|---------------|--------------|------------|---------------|--------------|------------|
| Benzene | ND | | 0.012 | ND | | 0.012 |
| Toluene | ND | | 0.060 | ND | | 0.060 |
| Ethyl Benzene | ND | | 0.060 | ND | | 0.060 |
| m,p-Xylene | ND | | 0.060 | ND | | 0.060 |
| o-Xylene | ND | | 0.060 | ND | | 0.060 |
| TPH-Gas | 7.9 | O | 6.0 | ND | | 6.0 |
| Surrogate Recovery: | | | | | | |
| Fluorobenzene | 91% | | | 74% | | |

gdc
3/17/04

Date of Report: March 2, 2004
Samples Submitted: February 19, 2004
Laboratory Reference: 0402-131
Project: C00-01419-057

NWTPH-Gx/BTEX

Date Extracted: 2-23-04
Date Analyzed: 2-24-04

Matrix: Soil
Units: mg/kg (ppm)

| | | |
|------------|----------------|----------------|
| Client ID: | GP3-4.5 | GP4-3.5 |
| Lab ID: | 02-131-03 | 02-131-04 |

| | Result | Flags | PQL | Result | Flags | PQL |
|---------------------|---------------|--------------|------------|---------------|--------------|------------|
| Benzene | 0.63 | | 0.23 | ND | | 0.011 |
| Toluene | ND | | 1.2 | ND | | 0.057 |
| Ethyl Benzene | 100 | | 1.2 | ND | | 0.057 |
| m,p-Xylene | 270 | E | 1.2 | ND | | 0.057 |
| o-Xylene | 6.7 | | 1.2 | ND | | 0.057 |
| TPH-Gas | 6400 | O | 120 | ND | | 5.7 |
| Surrogate Recovery: | | | | | | |
| Fluorobenzene | 76% | | | 97% | | |

gpc
3/17/04

Date of Report: March 2, 2004
Samples Submitted: February 19, 2004
Laboratory Reference: 0402-131
Project: C00-01419-057

NWTPH-Gx/BTEX

Date Extracted: 2-23-04
Date Analyzed: 2-23-04

Matrix: Soil
Units: mg/kg (ppm)

Client ID: **GP5-4**
Lab ID: 02-131-06

| | Result | Flags | PQL |
|--------------------------------------|--------|-------|-------|
| Benzene | ND | | 0.012 |
| Toluene | ND | | 0.060 |
| Ethyl Benzene | ND | | 0.060 |
| m,p-Xylene | ND | | 0.060 |
| o-Xylene | ND | | 0.060 |
| TPH-Gas | ND | | 6.0 |
| Surrogate Recovery: Fluorobenzene | 81% | | |

gpc
3/17/04

Date of Report: March 2, 2004
Samples Submitted: February 19, 2004
Laboratory Reference: 0402-131
Project: C00-01419-057

**NWTPH-Gx/BTEX
METHOD BLANK QUALITY CONTROL**

Date Extracted: 2-23-04

Date Analyzed: 2-23-04

Matrix: Soil

Units: mg/kg (ppm)

Lab ID: MB0223S1

| | Result | Flags | PQL |
|---------------------|--------|-------|-------|
| Benzene | ND | | 0.010 |
| Toluene | ND | | 0.050 |
| Ethyl Benzene | ND | | 0.050 |
| m,p-Xylene | ND | | 0.050 |
| o-Xylene | ND | | 0.050 |
| TPH-Gas | ND | | 5.0 |
| Surrogate Recovery: | | | |
| Fluorobenzene | 88% | | |

gsc
3/17/04

Date of Report: March 2, 2004
Samples Submitted: February 19, 2004
Laboratory Reference: 0402-131
Project: C00-01419-057

**NWTPH-Gx/BTEX
DUPLICATE QUALITY CONTROL**

Date Extracted: 2-23-04
Date Analyzed: 2-23-04

Matrix: Soil
Units: mg/kg (ppm)

| Lab ID: | 02-131-06 Original | 02-131-06 Duplicate | RPD | Flags |
|---------------------|-----------------------|------------------------|-----|-------|
| Benzene | ND | ND | NA | |
| Toluene | ND | ND | NA | |
| Ethyl Benzene | ND | ND | NA | |
| m,p-Xylene | ND | ND | NA | |
| o-Xylene | ND | ND | NA | |
| TPH-Gas | ND | ND | NA | |
| Surrogate Recovery: | | | | |
| Fluorobenzene | 81% | 78% | | |

gsc
3/17/04

Date of Report: March 2, 2004
Samples Submitted: February 19, 2004
Laboratory Reference: 0402-131
Project: C00-01419-057

**NWTPH-Gx/BTEX
MS/MSD QUALITY CONTROL**

Date Extracted: 2-23-04
Date Analyzed: 2-23-04

Matrix: Soil
Units: mg/kg (ppm)

Spike Level: 1.00 ppm

| Lab ID: | 02-131-06 MS | Percent Recovery | 02-131-06 MSD | Percent Recovery | RPD | Flags |
|---------------|-----------------|---------------------|------------------|---------------------|-----|-------|
| Benzene | 0.818 | 82 ✓ | 0.821 | 82 | 0 | |
| Toluene | 0.780 | 78 | 0.786 | 79 | 1 | |
| Ethyl Benzene | 0.795 | 80 ✓ | 0.801 | 80 | 1 | |
| m,p-Xylene | 0.793 | 79 | 0.797 | 80 ✓ | 1 | |
| o-Xylene | 0.793 | 79 | 0.802 | 80 ✓ | 1 ✓ | |

Surrogate Recovery:

| | | |
|---------------|-----|-----|
| Fluorobenzene | 78% | 78% |
|---------------|-----|-----|

gsc
3/17/04

Date of Report: March 2, 2004
Samples Submitted: February 19, 2004
Laboratory Reference: 0402-131
Project: C00-01419-057

NWTPH-Gx/BTEX

Date Extracted: 2-19-04
Date Analyzed: 2-19-04

Matrix: Water
Units: ug/L (ppb)

Client ID: FC3
Lab ID: 02-131-17

| | Result | Flags | PQL |
|---------------------|--------|-------|-----|
| Benzene | ND | | 1.0 |
| Toluene | ND | | 1.0 |
| Ethyl Benzene | ND | | 1.0 |
| m,p-Xylene | ND | | 1.0 |
| o-Xylene | ND | | 1.0 |
| TPH-Gas | ND | | 100 |
| Surrogate Recovery: | | | |
| Fluorobenzene | 111% | | |

gpc
3/17/04

Date of Report: March 2, 2004
Samples Submitted: February 19, 2004
Laboratory Reference: 0402-131
Project: C00-01419-057

**NWTPH-Gx/BTEX
METHOD BLANK QUALITY CONTROL**

Date Extracted: 2-19-04
Date Analyzed: 2-19-04

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0219W3

| | Result | Flags | PQL |
|---------------------|--------|-------|-----|
| Benzene | ND | | 1.0 |
| Toluene | ND | | 1.0 |
| Ethyl Benzene | ND | | 1.0 |
| m,p-Xylene | ND | | 1.0 |
| o-Xylene | ND | | 1.0 |
| TPH-Gas | ND | | 100 |
| Surrogate Recovery: | | | |
| Fluorobenzene | 112% | | |

gpc
3/17/04

Date of Report: March 2, 2004
Samples Submitted: February 19, 2004
Laboratory Reference: 0402-131
Project: C00-01419-057

**NWTPH-Gx/BTEX
DUPLICATE QUALITY CONTROL**

Date Extracted: 2-19-04
Date Analyzed: 2-19-04

Matrix: Water
Units: ug/L (ppb)

| Lab ID: | 02-131-17 Original | 02-131-17 Duplicate | RPD | Flags |
|---------------------|-----------------------|------------------------|-----|-------|
| Benzene | ND | ND | NA | |
| Toluene | ND | ND | NA | |
| Ethyl Benzene | ND | ND | NA | |
| m,p-Xylene | ND | ND | NA | |
| o-Xylene | ND | ND | NA | |
| TPH-Gas | ND | ND | NA | |
| Surrogate Recovery: | | | | |
| Fluorobenzene | 111% | 104% | | |

gpc
3/17/04

Date of Report: March 2, 2004
Samples Submitted: February 19, 2004
Laboratory Reference: 0402-131
Project: C00-01419-057

**NWTPH-Gx/BTEX
MS/MSD QUALITY CONTROL**

Date Extracted: 2-19-04
Date Analyzed: 2-19-04

Matrix: Water
Units: ug/L (ppb)

Spike Level: 50.0 ppb

| Lab ID: | 02-119-09 MS | Percent Recovery | 02-119-09 MSD | Percent Recovery | RPD | Flags |
|---------------|-----------------|---------------------|------------------|---------------------|-----|-------|
| Benzene | 45.8 | 92 | 46.1 | 92 | 1 | |
| Toluene | 46.1 | 92 | 46.7 | 94 | 1 | |
| Ethyl Benzene | 49.4 | 99 | 49.9 | 100 | 1 | |
| m,p-Xylene | 49.6 | 99 | 50.1 | 100 | 1 | |
| o-Xylene | 49.9 | 100 | 50.3 | 101 | 1 | |

Surrogate Recovery:

| | | |
|---------------|------|------|
| Fluorobenzene | 103% | 104% |
|---------------|------|------|

GAZ
3/11/04

Date of Report: March 2, 2004
Samples Submitted: February 19, 2004
Laboratory Reference: 0402-131
Project: C00-01419-057

NWTPH-Gx/BTEX

Date Extracted: 2-27-04
Date Analyzed: 2-27-04

Matrix: Soil
Units: mg/kg (ppm)

Client ID: **GP6-3**
Lab ID: 02-131-07

GP7-4
02-131-09

| | Result | Flags | PQL | Result | Flags | PQL |
|---------------------|--------|-------|-------|--------|-------|-------|
| Benzene | ND | | 0.011 | ND | | 0.011 |
| Toluene | ND | | 0.055 | ND | | 0.055 |
| Ethyl Benzene | ND | | 0.055 | ND | | 0.055 |
| m,p-Xylene | ND | | 0.055 | ND | | 0.055 |
| o-Xylene | ND | | 0.055 | ND | | 0.055 |
| TPH-Gas | ND | | 5.5 | ND | | 5.5 |
| Surrogate Recovery: | | | | | | |
| Fluorobenzene | 78% | | | 79% | | |

gpc
3/17/04

Date of Report: March 2, 2004
Samples Submitted: February 19, 2004
Laboratory Reference: 0402-131
Project: C00-01419-057

NWTPH-Gx/BTEX

Date Extracted: 2-27-04
Date Analyzed: 2-27-04

Matrix: Soil
Units: mg/kg (ppm)

Client ID: **GP9-4**
Lab ID: 02-131-11

GP10-4
02-131-12

| | Result | Flags | PQL | Result | Flags | PQL |
|--------------------------------------|---------------|--------------|------------|---------------|--------------|------------|
| Benzene | ND | | 0.011 | ND | | 0.011 |
| Toluene | ND | | 0.053 | ND | | 0.057 |
| Ethyl Benzene | ND | | 0.053 | ND | | 0.057 |
| m,p-Xylene | ND | | 0.053 | 0.24 | | 0.057 |
| o-Xylene | ND | | 0.053 | ND | | 0.057 |
| TPH-Gas | ND | | 5.3 | ND | | 5.7 |
| Surrogate Recovery: Fluorobenzene | 84% | | | 75% | | |

3/17/04

Date of Report: March 2, 2004
Samples Submitted: February 19, 2004
Laboratory Reference: 0402-131
Project: C00-01419-057

**NWTPH-Gx/BTEX
METHOD BLANK QUALITY CONTROL**

Date Extracted: 2-27-04

Date Analyzed: 2-27-04

Matrix: Soil

Units: mg/kg (ppm)

Lab ID: MB0227S1

| | Result | Flags | PQL |
|---------------------|--------|-------|-------|
| Benzene | ND | | 0.010 |
| Toluene | ND | | 0.050 |
| Ethyl Benzene | ND | | 0.050 |
| m,p-Xylene | ND | | 0.050 |
| o-Xylene | ND | | 0.050 |
| TPH-Gas | ND | | 5.0 |
| Surrogate Recovery: | | | |
| Fluorobenzene | 79% | | |

gsm
3/17/04

Date of Report: March 2, 2004
Samples Submitted: February 19, 2004
Laboratory Reference: 0402-131
Project: C00-01419-057

**NWTPH-Gx/BTEX
DUPLICATE QUALITY CONTROL**

Date Extracted: 2-27-04
Date Analyzed: 2-27-04

Matrix: Soil
Units: mg/kg (ppm)

| Lab ID: | 02-131-07 Original | 02-131-07 Duplicate | RPD | Flags |
|---------------------|-----------------------|------------------------|-----|-------|
| Benzene | ND | ND | NA | |
| Toluene | ND | ND | NA | |
| Ethyl Benzene | ND | ND | NA | |
| m,p-Xylene | ND | ND | NA | |
| o-Xylene | ND | ND | NA | |
| TPH-Gas | ND | ND | NA | |
| Surrogate Recovery: | | | | |
| Fluorobenzene | 78% | 79% | | |

gpc
3/17/04

Date of Report: March 2, 2004
Samples Submitted: February 19, 2004
Laboratory Reference: 0402-131
Project: C00-01419-057

**NWTPH-Gx/BTEX
MS/MSD QUALITY CONTROL**

Date Extracted: 2-27-04
Date Analyzed: 2-27-04

Matrix: Soil
Units: mg/kg (ppm)

Spike Level: 1.00 ppm

| Lab ID: | 02-131-07 MS | Percent Recovery | 02-131-07 MSD | Percent Recovery | RPD | Flags |
|---------------|-----------------|---------------------|------------------|---------------------|-----|-------|
| Benzene | 0.816 | 82 | 0.820 | 82 | 1 | |
| Toluene | 0.794 | 79 | 0.792 | 79 | 0 | |
| Ethyl Benzene | 0.810 | 81 | 0.810 | 81 | 0 | |
| m,p-Xylene | 0.807 | 81 | 0.804 | 80 | 0 | |
| o-Xylene | 0.812 | 81 | 0.813 | 81 | 0 | |

Surrogate Recovery:

| | | |
|---------------|-----|-----|
| Fluorobenzene | 76% | 78% |
|---------------|-----|-----|

gpc
3/11/04

Date of Report: March 2, 2004
Samples Submitted: February 19, 2004
Laboratory Reference: 0402-131
Project: C00-01419-057

% MOISTURE

Date Analyzed: 2-23-04

| Client ID | Lab ID | % Moisture |
|-----------|-----------|------------|
| GP1-5 | 02-131-01 | 16 |
| GP2-5 | 02-131-02 | 16 |
| GP3-4.5 | 02-131-03 | 14 |
| GP4-3.5 | 02-131-04 | 12 |
| GP5-4 | 02-131-06 | 16 |
| GP6-5 | 02-131-07 | 19 |
| GP7-4 | 02-131-09 | 19 |
| GP9-4 | 02-131-11 | 15 |
| GP10-4 | 02-131-12 | 12 |



Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
- B - The analyte indicated was also found in the blank sample.
- C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
- E - The value reported exceeds the quantitation range and is an estimate.
- F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
- G - Insufficient sample quantity for duplicate analysis.
- H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
- I - Compound recovery is outside of the control limits.
- J - The value reported was below the practical quantitation limit. The value is an estimate.
- K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
- L - The RPD is outside of the control limits.
- M - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
- O - Hydrocarbons outside the defined gasoline range are present in the sample.
- P - The RPD of the detected concentrations between the two columns is greater than 40.
- Q - Surrogate recovery is outside of the control limits.
- S - Surrogate recovery data is not available due to the necessary dilution of the sample.
- T - The sample chromatogram is not similar to a typical _____.
- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
- W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
- X - Sample extract treated with a silica gel cleanup procedure.
- Y - Sample extract treated with an acid cleanup procedure.
- Z -
- ND - Not Detected at PQL
- PQL - Practical Quantitation Limit
- RPD - Relative Percent Difference

**OnSite****Environmental Inc.**

14648 NE 95th Street • Redmond, WA 98052

Phone: (425) 883-3881 • Fax: (425) 885-4603

Chain of Custody

Page 1 of 2Turnaround Request
(in working days)

Laboratory Number:

02-131Company: **HERRERA ENVIRONMENTAL
CONSULTANTS**Project Number:
000-01419-057Project Name:
FEDMONAProject Manager:
BRUCE CARPENTERSampled by:
DIANA PHELAN

(Check One)

☐ Same Day ☐ 1 Day☐ 2 Day ☐ 3 Day☒ Standard (7 working days)☐ _____
(other)

Requested Analysis

| Lab ID | Sample Identification | Date Sampled | Time Sampled | Matrix | # of Cont. | NWTPH-HCID | NWTPH-Gx/BTEX | NWTPH-Dx | Volatiles by 8260B | Halogenated Volatiles by 8260B | Semivolatiles by 8270C | PAHs by 8270C / SIM | PCBs by 8082 | Pesticides by 8081A | Herbicides by 8151A | Total RCRA Metals (8) | TCLP Metals | HEM by 1664 | VPH | EPH | % Moisture |
|--------|-----------------------|--------------|--------------|--------|------------|------------|---------------|----------|--------------------|--------------------------------|------------------------|---------------------|--------------|---------------------|---------------------|-----------------------|-------------|-------------|-----|-----|------------|
| 1 | GP1-5 | 2-18-04 | 0900 | S | 2 | | X | | | | | | | | | | | | | | X |
| 2 | GP2-5 | 2-18-04 | 0915 | S | 2 | | X | | | | | | | | | | | | | | X |
| 3 | GP3-4.5 | 2-18-04 | 0940 | S | 2 | | X | | | | | | | | | | | | | | X |
| 4 | GP4-3.5 | 2-18-04 | 0955 | S | 2 | | X | | | | | | | | | | | | | | X |
| 5 | GP5-2.5 (HOLD) | 2-18-04 | 1020 | S | 2 | | | | | | | | | | | | | | | | |
| 6 | GP5-4 | 2-18-04 | 1025 | S | 2 | | X | | | | | | | | | | | | | | X |
| 7 | GP6-3 (HOLD) | 2-18-04 | 1055 | S | 2 | | ⊗ | | | | | | | | | | | | | | ⊗ |
| 8 | GP6-5 (HOLD) | 2-18-04 | 1100 | S | 2 | | | | | | | | | | | | | | | | |
| 9 | GP7-4 (HOLD) | 2-18-04 | 1115 | S | 2 | | ⊗ | | | | | | | | | | | | | | ⊗ |
| 10 | GP8-5 (HOLD) | 2-18-04 | 1130 | S | 2 | | | | | | | | | | | | | | | | |

| Signature | Company | Date | Time | Comments/Special Instructions: |
|---|-------------------|--|-------|--|
| Relinquished by: <i>Diana M. Phelan</i> | HERRERA | 2-19-04 | 07:20 | CALL RESULTS IN; MAY RUN ADDITIONAL ANALYSES. ⊗ Added 2/26/04. DB |
| Received by: <i>[Signature]</i> | OLSON | 2/19/04 | 720 | |
| Relinquished by: | | | | |
| Received by: | | | | |
| Relinquished by: | | | | |
| Received by: | | | | |
| Reviewed by/Date: | Reviewed by/Date: | Chromatograms with final report <input type="checkbox"/> | | |

Chain of Custody

Company: HERREDA ENVIRONMENTAL CONSULTANTS
Project Number: C00-01419-057
Project Name: FEDMON4
Project Manager: BRUCE CARPENTER
Sampled by: DIANA PHELAN

**Turnaround Request
(in working days)**

(Check One)

- ☐ Same Day ☐ 1 Day
☐ 2 Day ☐ 3 Day
☒ Standard (7 working days)
☐ _____ (other)

Laboratory Number:

02-131

Requested Analysis

| Lab ID | Sample Identification | Date Sampled | Time Sampled | Matrix | # of Cont. | NWTPH-HCID | NWTPH-Gx/BTEX | NWTPH-Dx | Volatiles by 8260B | Halogenated Volatiles by 8260B | Semivolatiles by 8270C | PAHs by 8270C / SIM | PCBs by 8082 | Pesticides by 8081A | Herbicides by 8151A | Total RCRA Metals (8) | TCLP Metals | HEM by 1664 | VPH | EPH | % Moisture |
|--------|-----------------------|--------------|--------------|--------|------------|------------|---------------|----------|--------------------|--------------------------------|------------------------|---------------------|--------------|---------------------|---------------------|-----------------------|-------------|-------------|-----|-----|------------|
| 11 | GP9-4 (HOLD) | 2-18-04 | 12:00 | S | 2 | | ⊗ | | | | | | | | | | | | | | ⊗ |
| 12 | GP10-4 (HOLD) | 2-18-04 | 12:25 | S | 2 | | ⊗ | | | | | | | | | | | | | | ⊗ |
| 13 | GP11-5 (HOLD) | 2-18-04 | 12:45 | S | 2 | | | | | | | | | | | | | | | | |
| 14 | GP12-4 (HOLD) | 2-18-04 | 13:10 | S | 2 | | | | | | | | | | | | | | | | |
| 15 | GP13-4 (HOLD) | 2-18-04 | 13:30 | S | 2 | | | | | | | | | | | | | | | | |
| 16 | GP14-3.5 (HOLD) | 2-18-04 | 13:45 | S | 2 | | | | | | | | | | | | | | | | |
| 17 | FC3 | 2-18-04 | 15:20 | Ⓢ | 3 | | X | | | | | | | | | | | | | | |

| Signature | Company | Date | Time | Comments/Special Instructions: |
|--------------------------------------|-------------------|--|--------------|--------------------------------|
| Relinquished by: <u>DIANA PHELAN</u> | <u>HERREDA</u> | <u>2-19-04</u> | <u>07:20</u> | ⊗ Added 2/26/04 - DB |
| Received by: <u>AS. J. J.</u> | <u>AS. J. J.</u> | <u>2/19/04</u> | <u>720</u> | |
| Relinquished by: | | | | |
| Received by: | | | | |
| Relinquished by: | | | | |
| Received by: | | | | |
| Reviewed by/Date: | Reviewed by/Date: | Chromatograms with final report <input type="checkbox"/> | | |

APPENDIX D

Waste Disposal Documentation

Certification No. 05-103
Billing Acct. No. 1030
Product Code. 64

BILL OF LADING

RS

REGIONAL DISPOSAL COMPANY

54 South Dawson Street

Seattle, WA 98134

Telephone: (206) 332-7700 / Fax: (206) 332-7600

This Bill of Lading augments the Master Service Agreement ("Agreement") entered into by Herrera
Environmental ("Customer") and Regional Disposal Company ("RDC")
on 2/10/05 (date). The terms herein are made a part of the Agreement. In the event of conflict between this Bill of
Lading and the Agreement, the terms of the Agreement prevail.

RDC hereby authorizes the Wastes ("Waste") described in Certification No. 05-1037, signed by Customer on
2/10/05 (date), for disposal at Roosevelt Regional Landfill. Customer shall present a copy of this Bill of Lading
with each shipment delivered.

Location of Waste: 4735 E. Marginal Way S., Seattle

Method of Shipment: Customer haul

Additional Fees (e.g., laboratory fees, transportation fees, special handling fees, etc. If none, so state):

* \$300 min. charge

PERFORMANCE DATE

FOR RDC TRANSPORTATION: Customer shall make the Waste available for shipment no later than _____ (date).
RDC shall transport the Waste no later than _____ (date), unless RDC notifies the Customer in writing that Waste
transport shall be suspended or canceled due to RDC's exercise of its right to inspect or analyze the Waste (as provided
in the Agreement).

FOR CUSTOMER TRANSPORTATION: Customer shall begin delivery of the Waste at (check one):

☐ Roosevelt Regional Landfill.

☒ Seattle Transfer Station located at Third and Lander.

Waste delivery shall begin no later than 2/10/05 (date), and shall complete delivery of the Waste no later than
2/15/05 (date), unless RDC notifies Customer in writing to suspend or cancel the waste delivery due to RDC's exercise
of its right to inspect or analyze the Waste (As provided in the Agreement).

CUSTOMER

Bruce A. Carpenter for Ron Smith GSA
Signature

Bruce A. Carpenter P.M. for U.S.GSA
Printed Name and Title

2/9/05

Date

REGIONAL DISPOSAL COMPANY

Leslie Whitman
Signature

Leslie A. Whitman - Sales Coordinator
Printed Name and Title

2/17/05

Date

ALL TRUCKS MUST HAVE A COPY OF THIS BILL OF LADING WHEN DELIVERING WASTE TO THE
TRANSFER STATION OR TO THE LANDFILL.

Revised: 1/26/96